

# Breast Screening Revisited

**Alka Agrawal, Prem Tripathi, Abhinav Sahu, Jalpa Daftary**

*Department of Radiodiagnosis, M.G.M. Medical College and M.Y. Hospital, Indore, Madhya Pradesh, India*

### ABSTRACT

Breast screening is the medical screening of asymptomatic, apparently healthy women for breast lump in an attempt to achieve an earlier diagnosis. The assumption is that the early detection will improve outcomes. In western countries, breast screening programs have led to a significant reduction in mortality and improved prognosis of patients with breast cancer. However in India, although the number of breast cancer are on the rise there is no such organized program. This article emphasizes on the importance of breast screening and protocol to be followed in our country where it can have significant impact on the prognosis.

**Keywords:** Breast screening, importance, mortality

### Introduction

Breast cancer is the commonest cancer among women in urban registries of New Delhi, Mumbai, Ahmedabad, Kolkata, and Trivandrum where it constitutes >30% of all cancers in females as per the Indian Council of Medical Research Population Based Cancer Registries (ICMR-PBCR) data (National Cancer Registry Programme, 2001). In the rural PBCR, breast cancer is the second commonest cancer in women after cancer of the uterine cervix. In Asia, breast cancer incidence peaks among women in their forties (Agarwal *et al.*, 2007), whereas in the United States and Europe, it peaks among women in their 60's. In India premenopausal patients constitute about 50% of all patients. Breast cancer has overtaken cervical cancer as the most common cancer in urban India. Breast screening is an important component and has contributed to the decline in breast cancer mortality in developed countries. While Europe and North America are debating the right age to initiate breast screening, India, South East Asia, and the Middle East are trying to raise awareness and establish the most feasible screening methods for the early detection of breast cancer.<sup>[1]</sup>

### Clinical relevance of breast screening

Breast cancer incidence is on the rise in India. There is no definite protocol of breast cancer screening for the primary care physicians to follow. Early detection of breast cancer through

screening is the only means to reduce the burden of morbidity and mortality. This article emphasizes the importance and protocol of screening, especially in high-risk females and females aged more than 40 years to create awareness among primary health care providers so as to optimize the management of breast cancer. The protocol and indication of different imaging modalities are discussed in this article.

### Incidence of breast cancer in India

According to a study by the International Agency for Research on Cancer (IARC), there will be approximately 250,000 new cases annually of breast cancer in India by 2015. At present, India reports around 100,000 new cases annually according to the ICMR. About 30,000 women die from breast cancer in India annually. According to the ICMR, 1 out of 22 women in India is diagnosed with breast cancer <3% of Indian women undergo screening for breast.<sup>[2]</sup>

A “normal” individual implies one who does not have any symptoms or signs of cancer. A lump may be present even before the symptoms manifest. By the time it is detected, it usually will have reached a size that will be a minimum Stage 2 cancer, if not more. As the size of a “tumor” increases, its potential to spread elsewhere also increases, and also affects the patient's survival. Hence, our aim is to catch the cancer before it is even felt as a lump, when it is very small; in other words, to detect it while it is in Stage 1. A patient has the best chance of long survival if the cancer is detected in the first stage. The size of breast cancer and how far it has spread are the most important factors in predicting the outcome and survival of a woman with this disease.

#### Access this article online

##### Quick Response Code:



**Website:**  
www.jfmpc.com

**DOI:**  
10.4103/2249-4863.148103

**Address for correspondence:** Dr. Jalpa Daftary,

Department of Radiodiagnosis, M.G.M. Medical College,  
Indore - 452 001, Madhya Pradesh, India.  
E-mail: daftary\_jalpa@yahoo.com

Regular breast screening is the best way to detect early breast cancer as they are most often successfully treated thus help saving lives, and it makes breast conservation surgery possible.<sup>[3]</sup>

Approximately 7 of 10 women whose cancer is diagnosed by screening have breast-conserving therapy compared with 55% diagnosed outside the screening.

### Women at higher risk of breast cancer

Factors that greatly increase breast cancer risk include:

- A mutation (or a first-degree relative with a mutation) in the BRCA1 or BRCA2 gene
- A strong family history of breast cancer, such as a mother and/or sister diagnosed at age 40 or younger
- A personal history of invasive breast cancer
- A personal history of ductal carcinoma *in situ* (DCIS), lobular carcinoma *in situ* (LCIS) or atypical hyperplasia
- Radiation treatment to the chest area during childhood or young adulthood
- A mutation (or a first-degree relative with a mutation) in the TP53 or PTEN genes.

## Methods of Breast Screening

### Breast awareness

Breast awareness implies familiarity with one's own breast. Knowing what is normal for you may help you see or feel changes in your breasts. A breast self-examination can be done monthly during the bath, best time being just at the end of menses. This helps to keep in notice any irregularity or any lumps in the breast.

A clinical breast exam (CBE) is a physical exam done by a trained medical staff. But breast self-exam and CBE have not proved effective for the purpose of breast screening.<sup>[4]</sup>

### Warning signs of breast cancer

- Lump, hard knot or thickening inside the breast or underarm area
- Swelling, warmth, redness or darkening of the breast
- Change in the size or shape of the breast
- Dimpling or puckering of the skin
- Itchy, scaly sore or rash on the nipple
- Pulling in of your nipple or other parts of the breast
- Nipple discharge that starts suddenly
- New pain in one spot that does not go away.

### Mammography

- Only system validated for screenings
- Greatest benefit is early detection (1.5–4 or more years earlier)
- Hence results in reduced mortality.

### Drawbacks

- Mammographic sensitivity for breast cancer declines significantly with increasing breast density

- It cannot be used reliably to differentiate benign from malignant process
- Screening mammography should not be used in pregnant women. While breastfeeding, the tissue in breasts may appear dense on a mammogram, making it hard to interpret.

### Indications for mammography screening

- Age 40 for the general population
- Age 25–30 for BRCA1 carriers and untested relatives of BRCA carriers
- Age 25–30 or 10 years earlier than the age of the affected relative at diagnosis (whichever is later) for women with a first-degree relative with premenopausal breast ca or for women with a lifetime risk of breast cancer  $\geq 20\%$  on the basis of family history
- Eight years after radiation therapy but not before age 25 for women who received mantle radiation between the ages of 10–30; and
- Any age for women with biopsy-proven lobular neoplasia, atypical ductal hyperplasia, DCIS, or invasive breast cancer
- Symptomatic women 35 years or above with lump or other clinical evidence of breast Ca
- Search for occult primary tumor in patients presenting with metastasis.<sup>[5]</sup>

An example of benign and malignant lesion on mammography is shown in Figure 1a and b.

### Digital mammography

Compared to film mammography, digital mammography appears to be better at detecting breast cancer in women who:

- Are premenopausal or peri-menopausal
- Are under age 50
- Have dense breast tissue.

### Breast imaging reporting and data system

Most mammography centers report the results of mammograms using the Breast Imaging Reporting and Data System (BI-RADS®). BI-RADS® was developed by the American College of Radiology to provide a standard way to describe the findings on mammograms (with categories numbered 0–6).

Final Assessment Categories	
0 =	Need Additional Imaging Evaluation or Prior Mammograms For Comparison
1 =	Negative There is nothing to comment on
2 =	Benign Finding
3 =	Probably Benign Finding (<2% malignant) Initial Short-Interval Follow-Up Suggested
4 =	Suspicious Abnormality (2 - 95% malignant) Biopsy Should Be Considered
5 =	Highly Suggestive of Malignancy(>95% malignant) Appropriate Action Should Be Taken
6 =	Known Biopsy – Proven Malignancy

## Ultrasonography

Most useful adjunct to mammography for the diagnosis of breast abnormalities.

- Ultrasonography (USG) has become the primary imaging modality for younger women and pregnant or lactating patients
- Because of its inability to demonstrate microcalcifications, sonography cannot replace mammography for the purpose of mass screening.

### Indications for breast ultrasonography

- Symptomatic breast lump in women aged <30 years
- Breast lump developing during pregnancy or lactation
- Assessment of the mammographic abnormality
- Clinical breast mass with a negative mammogram
- Breast inflammation
- Augmented breast
- Guidance of needle biopsy or localization.

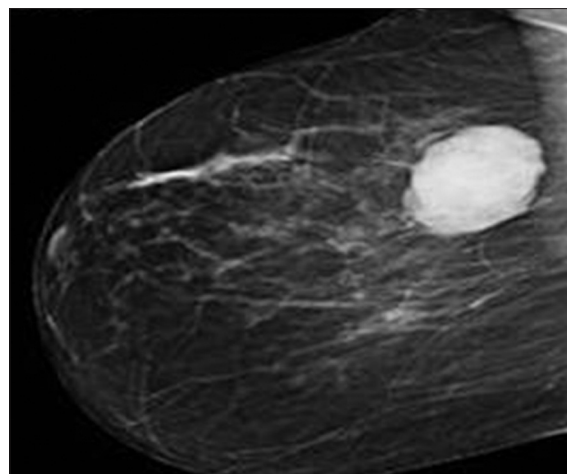
Ultrasound is better than mammography at identifying tumors within dense breast tissue.<sup>[6]</sup> An example of malignant breast lesion on USG is shown in Figure 2.

## Breast magnetic resonance imaging

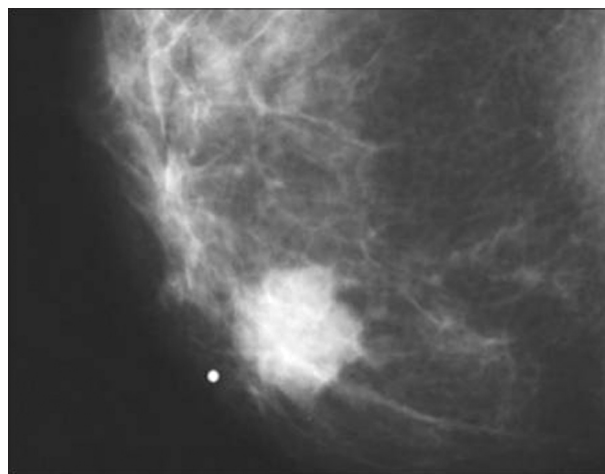
At this time, breast magnetic resonance imaging (MRI) is mostly used in breast cancer diagnosis and staging, rather than in screening. However, there is growing evidence that breast MRI in combination with mammography, compared with mammography alone, can increase detection of breast cancer in certain women at high risk. Screening with mammography plus breast MRI is recommended for the following women:

- Above age 25 every year in women with BRCA1 or BRCA2 mutation or a first-degree relative with a BRCA1 or BRCA2 mutation
- Above age 30 every year in women with strong family history of breast or ovarian cancer (for example, two or more first-degree relatives with breast cancer or two or more with ovarian cancer)
- In women who received radiation treatment to the chest area during childhood or young adulthood every year starting 8–10 years after radiation treatment or at age 40 (whichever age comes first)
- Li-Fraumeni, Cowden or Bannayan-Riley-Ruvalcaba syndrome (or family has a known mutation in the TP53 or PTEN genes) every year starting between ages 20 and 25
- A personal history of invasive breast cancer
- A personal history of DCIS, LCIS or atypical hyperplasia
- Very dense breast tissue.<sup>[7]</sup>

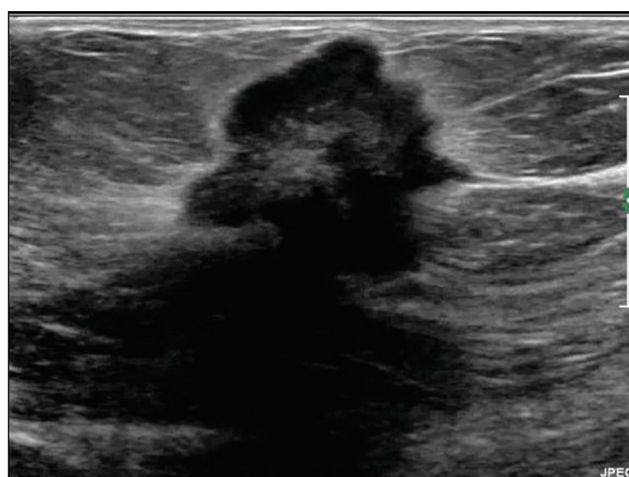
An example of malignant breast lesion on MRI is shown in Figure 3.



**Figure 1a:** A well-defined rounded density on mammography-breast imaging reporting and data system 2



**Figure 1b:** A spiculated, irregular high-density mass on mammography breast imaging reporting and data system 5



**Figure 2:** An irregular solid hypoechoic mass on breast ultrasonography with spiculated margins, taller than wide, showing posterior acoustic shadowing-breast imaging reporting and data system 5



## Discussion

Screening is a systematic evaluation of a “normal” individual to see if there is any underlying cancer. Routine breast screening greatly increases the rate of early breast cancer detection, in particular for noninvasive DCIS, sometimes called “prebreast cancer,” which almost never forms a lump and which generally cannot be detected except through mammography.

### For women aged 50–69 years

- The life-saving benefits of mammography are clear. All women ages 50–69 should have mammograms on a regular basis
- Meta-analyses of randomized controlled trials of screening mammography have shown that screening mammography reduces breast cancer mortality by up to 25% in women aged 50–69 years
- The USPSTF, IARC 2002 as well as Cochrane review found that the relative risk (RR) of mortality from breast cancer associated with screening mammography was in the range of 0.75–0.78.

### For women aged 40–49

- Mammography in women ages 40–49 may save lives, but the benefit for younger women may be less than for older women. Evidence about it is not definitive
- Evidence from randomized controlled trials is consistent with a 15% reduction in mortality from breast cancer for annual screening of women aged 40–49 years. The risk reduction is less than that for women aged 50–69 years
- This is because of higher rates of false-positive and false-negative results for women aged 40–49 years due to the lower sensitivity and specificity of mammography in younger women due to higher breast density. This problem can be overcome by use of digital mammography and sonography
- The USPSTF, IARC 2002 as well as Cochrane review found that the RR of mortality from breast cancer associated with screening mammography was in the range of 0.81–0.85.

### For women above the age of 70 years

- Overall, screening mammography is probably beneficial for women aged over 70 years who are in good health and have a life expectancy of about 10 years
- Data is not available to identify an upper age limit at which screening mammography ceases to be appropriate. This should be a decision made by patients in consultation with their health care providers (Barratt *et al.* 2002; NHSBSP 2006).<sup>[8–10]</sup>

Screening targeted toward women with above-average risk produces more benefit than screening of women at normal or low risk for breast cancer.

A report in 2006 by the advisory committee on breast cancer screening indicated that screening saved 1400 lives a year in England. International Association for cancer research has shown



**Figure 3:** An irregular heterogeneously enhancing mass on magnetic resonance imaging with spiculated margins s/o malignancy

that for every 500 women who have breast screening one life will be saved. Thus, women who take part in screening reduce their risk of dying from breast cancer.

A trial conducted in Norway that included 41,833 women aged 50–69 years during 1995–2004 showed that the risk of death from breast cancer was 14% lower in screened women compared to the unscreened.<sup>[11,12]</sup>

According to an article published in PubMed the 5 year survival rates of screen-detected cancer patients were higher 91.7% than that of patients presenting symptomatically (78.6%).<sup>[13]</sup>

The first nationwide mammographic screening program in Asia Breast Screen Singapore showed that compared with symptomatic cancers, screen-detected lesions were of smaller size, a lower stage lower histological grade 1–2, with a higher incidence of DCIS and higher rates of breast conservation.<sup>[14]</sup>

In the Canadian National Breast Screening study, the 25 years survival rate was 70.6% for women with cancer who were screened while it was 62.8% for the other group.<sup>[15]</sup>

In India due to lack of awareness, no proper organized screening program for breast is in action. However, the effectiveness of breast screening in other countries has significant benefits so it is most likely it will prove fruitful in India

The following factors make screening extremely important especially in India:

- Age shift (more young women affected in their 30s and 40s)
- Rising number of cases of breast cancer in India
- Late presentation (this directly decreases long-term survival of the patient)
- Lack of awareness among women
- Aggressive cancers in young (the younger the age before menopause, the more aggressive the cancer).

Early detection through screening is important particularly in the middle- and low-income countries like India where disease is diagnosed late, and there are limited resources. Thus, this strategy can produce down-staging of the disease to stages more amenable to curative treatment.

## Conclusion

Breast screening has a significant impact on mortality and prognosis of breast cancer. Through breast screening, cancers can be detected early when they are small and have not spread to lymph nodes making breast conservation possible as well causing reduction in mortality from breast cancer. Therefore in our country breast screening should be given due importance. Keeping this in mind, the primary health care providers can make the general population aware about breast screening and its protocol.

## References

- Reddy N, Ninan T, Tabar L, Bevers T. The results of a breast cancer screening camp at a district level in rural India. *Asian Pac J Cancer Prev* 2012;13:6067-72.
- Indian Council of Medical Research: National Cancer Registry Programme. Consolidated Report of Population Based Cancer Registries; 2001-2004. Available from: <http://www.icmr.nic.in/nrcp>.
- Bock K, Borisch B, Cawson J, Damtjernhaug B, de Wolf C, Dean P, *et al.* Effect of population-based screening on breast cancer mortality. *Lancet* 2011;378:1775-6.
- Thomas DB, Gao DL, Ray RM, Wang WW, Allison CJ, Chen FL, *et al.* Randomized trial of breast self-examination in Shanghai: Final results. *J Natl Cancer Inst* 2002;94:1445-57.
- Kopans BD. Screening mammography. In: Kopans DB, editor. *Breast Imaging*. 3<sup>rd</sup> ed. Philadelphia: Lippincott, Williams and Wilkins; 2007. p. 121-190.
- Nothacker M, Duda V, Hahn M, Warm M, Degenhardt F, Madjar H, *et al.* Early detection of breast cancer: Benefits and risks of supplemental breast ultrasound in asymptomatic women with mammographically dense breast tissue. A systematic review. *BMC Cancer* 2009;9:335.
- Saslow D, Boetes C, Burke W, Harms S, Leach MO, Lehman CD, *et al.* American Cancer Society guidelines for breast screening with MRI as an adjunct to mammography. *CA Cancer J Clin* 2007;57:75-89.
- Nelson HD, Tyne K, Naik A, Bougatsos C, Chan BK, Humphrey L, *et al.* Screening for breast cancer: An update for the U.S. Preventive services task force. *Ann Intern Med* 2009;151:727-37, W237.
- Cologne N, Petiti DB, DeWitt TG. Screening for breast cancer: US preventive services task force recommendation statement. *Ann Intern Med* 2009;151:716-26.
- Breast Screen Australia Evaluation-Policy Analysis Project-June 2009 HDG Consulting Group for the Australian Government Department of Health and Ageing Online ISBN: 978-1-7421-002-09 Publications Number: P3-6002.
- Kalager M, Haldorsen T, Bretthauer M, Hoff G, Thoresen SO, Adami HO. Improved breast cancer survival following introduction of an organized mammography screening program among both screened and unscreened women: A population-based cohort study. *Breast Cancer Res* 2009;11:R44.
- Kalager M, Zelen M, Langmark F, Adami HO. Effect of screening mammography on breast-cancer mortality in Norway. *N Engl J Med* 2010;363:1203-10.
- Yassin MM, Peel AL, Thompson WD, Patton J, Ashton V, Leaper DJ. Does screen-detected breast cancer have better survival than symptomatic breast cancer? *Asian J Surg* 2003;26:101-7.
- Chuwa EW. Early detection of breast cancer through population-based mammographic screening in Asian women: A comparison study between screen detected and symptomatic breast cancers. *Breast J* 2009;15:133-9.
- Miller AB, Wall C, Aines C, Sun P, To T, Narod SA. Twenty five year follow-up for breast cancer incidence and mortality of the canadian national breast screening study: Randomized screening trial. *BMJ* 2014;348:G366.

**How to cite this article:** Agrawal A, Tripathi P, Sahu A, Daftary J. Breast screening revisited. *J Fam Med Primary Care* 2014;3:340-4.

**Source of Support:** Nil. **Conflict of Interest:** None declared.